

DIY

Worthwhile projects you can build on your own



How to install a PL-259 connector

Just like you, I often need to install a PL-259 connector on a length of coax (coaxial cable), to attach it to the mating SO-239 connector of a mobile or base station radio. But many seem to struggle with installing one properly, if they have the courage to attempt it at all. Well, to help you feel just a little bit more comfortable trying this at home, I thought a little article with photos might be just what you need.

I address two sizes: RG-8X and LMR-400, but similar principles apply to other sizes. Also, the size of RG-8X is close enough to that of LMR-240 to consider them equal, for connector considerations. The size of LMR-400 is close enough to that of RG-213 and RG-8/U to consider them equal, for the same reason. Make sure you use **ONLY** the crimp connector with the size that matches your cable size. *RG-8X is NOT the same as RG-8/U.*

Parts list:

- coaxial cable
- PL-259 crimp connector
- heat shrink tubing

Tools list:

- large wire (cable) cutters
- small wire cutters
- sharp utility knife
- 60+watt soldering iron
- 63/37 rosin-core solder
- solder sucker
- heat blow gun
- ice pick or paper clip
- cable crimpers
- scissors
- DMM (digital multi-meter)



If you attempt to use a soldering gun or iron with a rating that's under 60 watts, you'll need to apply heat to the connector shaft for such a long period of time, that you stand melting the Teflon dielectric, resulting in your possibly destroying the connector. Also, 63/37 solder is quickly getting replaced by lower-quality, higher-melting point material, making it even more important to use a very hot soldering iron. Be sure to wear goggles for soldering safety.

If your working space is dimly lit, it helps to wear a head lamp. The heat shrink tubing is only cosmetic, but does give the finished product a professional appearance. The diameter of the unheated shrink tubing should be just large enough to fit comfortably over the crimp sleeve.

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Take a deep breath, and get started

Cut about 1" (1-1/2" for LMR-400) of the heat shrink tubing, slip it over the cable, and move it a couple of feet away from the end. Unscrew the threaded ring from the PL-259 connector, and slip it over the cable, the smaller inside-diameter end on first, and move it down the cable with the heat shrink tubing. Slip the crimp sleeve of the PL-259 connector over the cable, and move it down the cable with the ring and heat shrink tubing.



PL-259 crimp connector

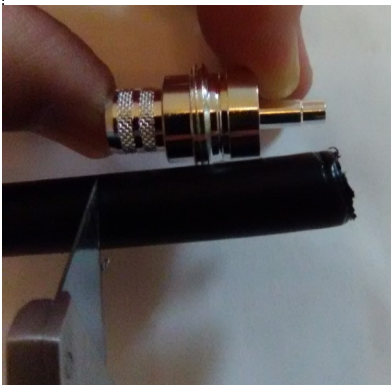


threaded ring, shaft, and sleeve

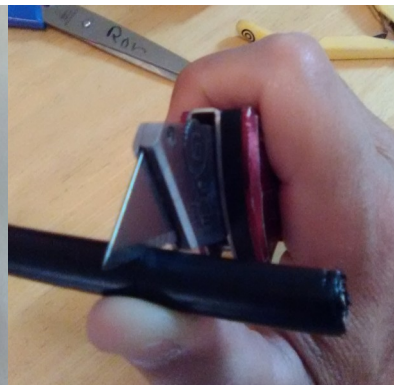


tubing, sleeve, and ring

Using the entire remaining PL-259 connector shaft, measure at the end of the cable the length of the connector shaft from the tip to the other end, plus about 1/8", and cut a circumference into the jacket with a utility knife. Make sure you **NEVER** slice the jacket with a back-and-forth sawing motion, like you're slicing a loaf of bread. Instead, with the sharp blade edge against the jacket, **press down** on the knife, so that the sharp edge sinks down into the jacket until it stops at the shield. Repeat until the shield is visible the entire circumference of the jacket.



measure with the shaft



cut the circumference



cut length-wise

With RG-8X cable you might be able to slide the jacket off the shield at this point. Others might need the following. Press down on the cable jacket (once again, do **NOT** slice into the jacket) with the utility knife, this time making a cut length-wise (perpendicular to the first cut), and from there to the end of the cable, which should allow you to lay the jacket open, and peel off the open jacket. At this time, go ahead and plug in the soldering iron and turn it on.

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With the ice pick (I actually use a dentist tool, as shown), gently spread and part the shield fibers almost down to the jacket. Use scissors to cut off all but about 1/4" of the shield fibers, then continue parting the shield fibers until none are intertwined with each other.



peel off the jacket



spread and part the shield fibers

Strip off the center dielectric to the thread of the PL-259 shaft, plus about 1/16". Straighten the center conductor as much as you can. Slide and slightly twist the PL-259 connector shaft onto the coax center conductor and center dielectric all the way, until the end of the connector presses against the spread shield fibers. If more than 1/16" of the coax center conductor protrudes through the connector pin hole, use small wire cutters to cut it back.



strip off half the center dielectric



ready for the connector



slip on the connector

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Using just a tiny amount, solder the coax center conductor showing, to the connector pin, allowing the solder to wick a little into the pin. Determine whether the center pin has too much solder buildup, by testing whether it's easy to insert it into an SO-239 connector, like that on a barrel connector. If it's not easy to insert, you might need to use the solder sucker or utility knife to remove the excess solder.



solder the tip

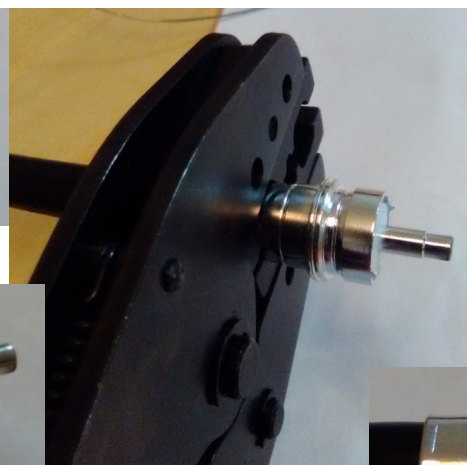


test the fit with a barrel connector

Once the center pin looks and fits good, manually fold the shield fibers up over the bottom of the connector shaft, then slide the crimp sleeve over the shield fibers until the crimp sleeve is flush with the connector shaft. Using the appropriate crimpers, crimp the sleeve only once and fully tight, until the crimper ratchet is released.



fold up the fibers



crimp the sleeve



slide the sleeve over the fibers



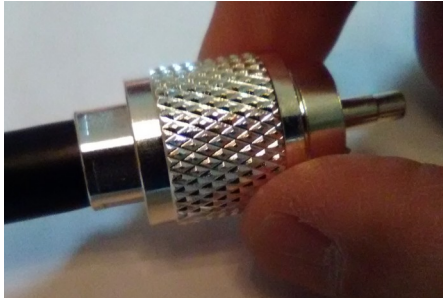
the finished crimp

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Screw the threaded ring onto the connector shaft threads until it spins freely.



screw on the threaded ring



threaded ring fully on

Slip the heat shrink tubing up onto the crimped sleeve, completely covering but not going past the sleeve. Use the heat gun to shrink the tubing completely around it. Once it cools, you'll have a connector that not only works flawlessly, but looks terrific. Amateur-made, with a professional appearance.



preparing for heat-shrinking



the finished connector



test for center and shield continuity

Use the DMM to test for shorts and opens on the cable. In other words, make sure the center pin on one end is connected to the center pin on the other end, but is not connected to the shield on either end, etc.



test for shorts